PRACTICE AND REINFORCEMENT IN THE LEARNING OF SOCIAL NORMS

By

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To Molly

No man is an Iland, intire of itselfe;
every man is a peece of the Continent,
a part of the maine; if a Clod bee
washed away by the Sea, Europe is the
lesse, as well as if a Promontorie were,
as well as if a Mannor of thy friends
or of thine owne were, any man's death
diminishes me, because I am involved in
Mankinde; And therefore never send to
know for whom the bell tolls; it tolls
for thee.

John Donne (1573-1631)
Devotions. XVII

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INTRODUCTION

Perspective

Man is a creature of habit. The evidence for this generalization comes from a variety of sources, literary, historical, and scientific. The concepts of "cultural lag," "functional autonomy," and "rigidity," are examples of technical terms which have been coined to describe habitual tendencies in man and society. Theoretical formulations in terms of habit are adequate for dealing with the consistency of human behavior, but can these theories deal with the inconsistencies? Brilliant scientific breakthroughs and dramatic social changes do not readily fit the conception of man as a habit-bound animal.

In the literature dealing with social change, attitude change is a topic of major interest. Attitudes are regarded as tendencies to react in certain ways to social stimuli. There is much interest in the variables involved in the formation and change of these response tendencies. How well can changes in attitude be predicted? It is not necessary to look far back in the past for instances of rather dramatic changes in attitudes which, a priori, appeared fixed. The recent changes in the behavior of groups of individuals following the federal government's pressure for racial integration might be cited. Can these changes be dealt with by traditional learning approaches? Perhaps not. It seems probable, however, that some of the newer, descriptive approaches to the psychology of social change (e.g., McClelland's 1955

treatment) will need explanatory underpinnings in terms of specific learning principles.

Our concern is with the applicability of learning theory to problems of social change. Particularly, the present study deals with the role of habit. Are the traditional variables of practice and reinforcement useful in dealing with social "habits"?

Purpose of the Study

In an article published in a volume entitled Social Change, John Dewey (1938) argues for more explicit recognition of what he calls "the inertia of custom." "Habit," says Dewey, "not original human nature, keeps things moving most of the time, about as they have moved in the past." Traditional experimentation on attitude change has tended to neglect the problem of habit in studying the variables which produce change. The present study attempts to explore some of these learning factors. Because of the need for laboratory control, perceptual "norms" are studied, it being assumed that the learning processes are similar in the case of attitudes.

Sherif (1937) and Harvey and Rutherford (1958) have suggested that autokinetic (AK) norm formation is a reasonable analogue for the process by which attitudes are formed. A difficulty encountered by studies of attitude change is that the learning history of the attitude is unknown. This became apparent in a study by Shaw and Stone (1962). In their experiment, an attempt was made to change opinions on an issue (the smoking-cancer issue) by reinforcement. The results were negative. It seemed apparent that one of the difficulties lay in the complexity of the "opinion" measured. The saliency of the topic for

individuals, for example, was an untapped dimension in the questionnaire used. A somewhat similar study by Singer (1961), used a more restricted class of responses (answers to F- and E-Scale items). Although Singer reported some positive results, he found the generality of the change to be quite limited. In the present study, the durability of the effects of verbal reinforcement upon social (autokinetic) norms was studied. The advantage of using the AK effect was that it was a novel situation for all Ss; the learning "history" of each S's norm was controlled.

Problem

Conformity and Conversion

It has been pointed out (Blake & Mouton, 1961) that two general types of experimental studies have been carried out in the study of interpersonal "influence." The first is the "conformity" study, typified by Asch's (1956) experiments and by many of the experiments which have used the AK effect. In the conformity experiment, the degree of change under an immediately present influence attempt is the dependent variable.

The second type of study is the "conversion" design, in which S's behavior is measured sometime after the influence attempt. Most attitude change studies are of this type; the attitude is measured before and after the independent variable is introduced. The present emphasis is on the conversion design.

Autokinetic Norms and Attitudes

Sherif (1935) was the first to use the AK effect in the study of social process, although the AK effect had been known to psychologists

for many years. A review by Adams (1912) illustrates the early interest in the phenomenon.

Sherif's Ss observed the apparent movement of a tiny point of light in a dark room. When Ss observed the point repeatedly, E found that their reports of movement stabilized within a certain range and varied about a stable median value (norm). The ranges and norms were quite variable from S to S, but Sherif found that the estimates of Ss who had established norms in an alone session converged toward a common norm when Ss judged together.

Following up his early work, Sherif has published a number of studies, pursuant to his thesis that the internal scales or subjective frames of reference are important determinants of behavior (Sherif, 1936, 1937; Sherif & Sherif, 1956; Sherif & Hovland, 1961). Sherif has attempted to relate the "norm formation" process to social attitudes. A quotation from his text (Sherif & Sherif, 1956) illustrates his argument:

> If a predetermined range and norm can be developed in a social situation and if the individual subsequently carries that norm to an alone situation in which there is no external pressure, then it can be said that a characteristic and consistent mode of behavior (i.e., attitude) is produced in elementary form.

Sherif refers to the study by Rohrer, et al. (1954) in support of this position. The investigators found that AK norms formed in an interaction situation persisted when Ss were tested alone a year later.

Many writers (e.g., Doob, 1947) might disagree with Sherif's characterization of attitude as "a characteristic and consistent mode

of behavior." However, no one seems to disagree that the formation of AK norms may be similar in many respects to attitude formation. Taken as an analogous process, the study of AK norms has promise in our endeavor to understand attitude formation and change.

Conversion of Autokinetic Norms

Many of the studies which have utilized the AK phenomenon have examined factors contributing to "conformity" in the situation. Fewer investigators have used the "conversion" design in studying the enduring effects of the conformity manifested in the laboratory.

Rohrer et al. (1954), in a study referred to earlier, used the conversion design. The study demonstrated that AK norms persist for long periods of time. Bovard (1948) had Ss judge movement of the AK light for 50 trials alone, then for 50 trials with an "expert" who attempted to influence S's norm. The measure of conversion was taken in a third session, 28 days later, in which S again made 50 judgments alone. The major findings concerned the individual differences between Ss. Ss who were most influenced by the "expert" were the best "norm carriers" (i.e., they retained the norm formed in the group more than Ss who were less influenced).

Factors Affecting the Stability of Autokinetic Norms

The procedure in the present experiment was to establish norms under varying conditions of practice and group size before beginning the influence attempt. There is relatively little information on the effects of these variables on the strength (resistance to change) of AK norms. Some representative findings follow.

Group size. Sherif's (1935) data show no differences in the

subsequent alone judgments of individuals who had formed norms in two- or three-man groups (although the three-man group medians were more variable than those of the two-man groups). Sherif did observe that there is less change when S is shifted from the group to the alone condition than when the change is from alone to the group judging condition.

A pertinent study in our consideration of the effect of group size is the study by Jacobs and Campbell (1961). Their "laboratory microculture" consisted of a continually changing group. After a fixed number of judgments was made, one S left the group, and a new S took his place (starting the second "generation"). In the first generation, one or more of the Ss was a stooge of E. The stooge established an arbitrary "cultural norm" of 15.5 inches. In each culture, the norm decayed gradually to the control group median estimates (averaging 3.8 inches). The size of the group had no clear effect on the duration of the norm.

Practice. There are relatively little data on the effects of "practice" on strength of norms. One study appeared at first to offer some information (Harvey & Rutherford, 1958). The investigators found that Ss having 30 pretrials in judging the AK light were more resistant to change than Ss having only 15 pretrials. However, the experimenters also told the 30 trial Ss (after every 5 pretrials) that they "seemed to be very accurate." The Ss who had 15 pretrials, on the other hand, were told at the same intervals that they were "not being very accurate." Thus reinforcement was confounded with practice in this experiment.

A pilot study conducted prior to the present experiment contributed some information which tended to show that practice is important in the formation of norms. The Ss (15 female laboratory technicians) judged 75 presentations of the AK light alone. The variable expected to produce change in Ss' estimates was "decrease in intensity of the AK light." Reports by Luchins (1954) and Edwards (1954) had suggested the efficacy of this treatment. The 5 Ss in Group A experienced the reduction in intensity after the first block of 25 trials, Ss in Group B had the reduction in intensity after 50 trials, and Group C had all 75 trials at the high intensity.

The results of this pilot study were as follows: Ss in Group A, who had the least experience, increased their estimates more than Ss in Group B. An analysis of covariance showed no significant differences, although the adjusted group means were in the predicted order (1.78, 1.55, and 1.12 inches, respectively, for groups A, B, and C).

Effects of practice in other judgmental situations. If, as Sherif and Hovland (1961) believe, studies of psychophysical judgment are relevant in the present context, the effects of practice in the "lifted weight" experiments should be examined. Two studies which investigated the effects of practice on durability of the subjective scale are cited here as examples.

After a series of adaptation trials with a series of weights, Harvey and Campbell (1963) introduced an anchor weight either above or below the adaptation series. Tresselt (1947), using a similar adaptation period, then extended the range of weights. Neither study

showed convincing evidence of the effect of previous experience; however, Harvey and Campbell did find that judgments of Ss who formed a "weak" scale (10 adaptation trials) were less variable than the judgments of Ss who formed a "strong" (25 trial) preanchor scale. Also, Ss with a weak scale judged the anchor stimulus to be significantly heavier than did the strong scale Ss.

Other variables affecting the stability of AK norms. Although the group size and practice variables are of major interest, brief mention should be made of some other factors which have been studied. Kelman (1950), Mausner & Bloch (1957), and Harvey and Rutherford (1958) have demonstrated that "success" and "reinforcement" increase resistance to norm change (as compared to "failure" and "nonreinforcement") of Ss' estimates in the preinfluence sessions.

Personality differences have also been shown to affect resistance to pressure for norm change. Bray (1950) found differences in conformity on the basis of Ss' personality and attitude scale scores. Anti-Negro Ss conformed more to the judgments of a Negro confederate than did pro-Negro Ss. Opposite results were found for the Jewish "stooge." "Nervous tension" (GAMIN Scale) was highly correlated with conformity in prejudiced but not in unprejudiced Ss. Other investigators (Canning and Baker, 1959; Millon & Simkins, 1957) have found that "authoritarian" Ss are more influenced by social pressure.

Operant Conditioning of Norms and Attitudes

The effects of reward and punishment on perception have been studied by a number of investigators. Solley and Murphy (1960)

reviewed many of these studies. Related to the interest in perception is the newer work in "verbal conditioning," which has been reviewed recently by Greenspoon (1962). Some experiments of special interest are cited here.

Conditioning of autokinetic estimates. Manipulation of Ss' estimates in the AK situation by reinforcement had been reported in the literature prior to the increased interest in verbal conditioning (Haggard & Rose, 1944; Haggard & Rabin, 1948). These investigators were interested in changing the perceived direction of movement.

More recently, Kanfer (1954) and Spivak and Papajohn (1957) have demonstrated that S's reports of the extent of movement can be changed by conditioning. These studies also reported on the effects of partial reinforcement schedules on the durability of the effect (or upon "conversion"). Typically, reinforcement causes a restriction in range of responses, and also causes changes in the median or norm (depending, of course, upon the responses reinforced). These experimenters allowed only a few estimates before they began the conditioning procedure; S did not have time to form a very strong "norm."

Reinforcement of opinions and attitudes. Some interesting attempts have been made to manipulate attitudes by operant conditioning techniques. A number of studies have been done in this general area (e.g., Scott, 1957, 1959). The studies cited here, however, are those which used procedures directly comparable to those used in the "verbal conditioning" studies (e.g., Greenspoon, 1955).

Oakes, et al. (1961) influenced conclusions reached in group discussion by means of a light flashed in front of S during the

discussion. Ss were told that a light flash would indicate that they had "demonstrated psychological insight." Both the nature of statements made in the discussion and Ss' conclusions were influenced by "reinforcement."

Singer (1961), in a study mentioned earlier, was able to demonstrate changes in Ss' responses to the California Ethnocentrism Scale following reinforcement of "unprejudiced" responses to the related F-Scale (Adorno, et al., 1950). Singer used a pre- and post-test or "conversion" design. Generalizations from his findings are limited by the fact that changes in Ss' E-Scale responses were found only if the experimenter remained in the room while S filled out the post-experimental test!

Shaw & Stone's (1962) unpublished study used a procedure similar to Singer's, but the attitude in question was "attitude toward the harmful effects of smoking." During a discussion between two Ss, both were reinforced by E for statements favoring the view that smoking causes cancer. No significant changes were found between Ss' responses to the pre- and post-experimental questionnaires.

Rogers (1960) used the Adjective Self Description Test as a Measure of the self concept. Ss were reinforced for positive self-referent statements in an interview. Although Ss showed evidence of conditioning, no differences were found between pre- and posttest measures.

A large number of verbal conditioning studies, particularly those involving conditioning in interviews and in group interaction situations, are relevant to the present topic. Greenspoon's (1962)

review summarizes many of these studies. In general, the results of the verbal conditioning studies have shown little generalization and no long-lasting effects.

Classical Conditioning and Attitude Change

A discussion of conditioning and attitude change would be incomplete without a brief reference to the work which has been done in classical conditioning of attitudes. The interested reader may wish to refer to the work of Staats & Staats (1958), or that of Razran (1954), to mention but two of the contributors to the literature in this area.

Rationale of the Present Study

In planning the present experiment, the AK norm was taken as an analogue for more complicated judgmental and evaluative processes. Explicit attention to learning factors involved in the establishment of these norms has been neglected, with a few exceptions. Kelman (1950), for example, used Doob's (1947) Hullian formulation of attitude to structure his approach.

The "conversion" design of attitude change experiments was employed in the present study. The methodology is quite similar to that which has been used in verbal conditioning experiments. The study is an empirical one, with few assumptions. A simple stimulus-response-reinforcement learning model is used; no attempt is made to structure the situation in terms of, for example, Doob's more sophisticated model.

The assumptions upon which the hypotheses were based concern

(1) the nature of the stimuli involved in the autokinetic situation, (2) the response involved, and (3) the action of the assumed reinforcers in the situation.

Stimuli. The nature of the mechanisms responsible for the AK illusion is not well understood. Although some writers (Crutchfield & Edwards, 1949) feel that they have definitive answers, in general there seems to be no weight of evidence favoring either the "central" or the "peripheral" theories. It seems reasonable to assume that both eye movement and central factors are involved.

In the present approach, it was assumed that the actual central stimulation remains relatively constant, varying around a stable value. The changes in Ss' reports are assumed to be the result of changes in S's interpretation or "perception" of the stimulation.

The response. The responses with which we are dealing in this paper are S's verbal reports. S's norm is the mean of a series of such reports. No attempt is made to conceptualize the process in terms of "implicit responses" (Doob, 1947), nor to distinguish between perception and verbal report (as do Hood & Sherif, 1962).

Reinforcement. When an individual first finds himself in a situation in which he is asked to make AK judgments, he is "anxious," as attested by his own reports. Sherif (1937) reports such emotional factors: his testimony is confirmed by the observations of the writer. "Anxiety" was particularly evident in the female Ss who served in the pilot study on practice. Some of these Ss felt that they "just couldn't" estimate the distance. It seems reasonable to assume that

finding that he can make a judgment will reinforce the responses just made by S. This assumption is in accord with the observation made by Solley and Murphy (1960) that "the achievement of percepts is reinforcing to the perceptual act." It also seems reasonable that this reinforcing effect would be greatest on the early trials.

There is some evidence to indicate that the presence of other individuals, and the hearing of their reports will reinforce the judgments which S makes. The literature cited on the effects of group size may be interpreted in reinforcement terms. It is to be expected that norms formed together, as Sherif (1935) demonstrated, will be more resistant to change than norms formed alone. The existing literature gives us little help in predicting whether the maximum reinforcement will be obtained with one other person or with a larger group.

General Hypotheses

Specific hypotheses will be discussed in the next chapter. In general, it is hypothesized that Ss' responses to the AK stimulus are differentially reinforced. When he serves alone, the making of a response reinforces that response. When S judges with others, their agreement will constitute additional reinforcement. It is predicted that stronger "habits" or norms will be developed in larger groups and with more practice during norm formation. Persons with relatively stronger norms will be more resistant to change in their norms.

METHOD

Subjects

Ss were 150 male students, ages 18 to 30, from introductory psychology classes at the University of Miami (Florida). They received extra credit for participating in the experiment. Data from 110 Ss are reported here. Twelve Ss failed to return for the second session, seven were above the predetermined age range, and nine did not meet the conditioning criterion. Nineteen Ss were discarded for the following reasons: Five were foreign students, one misunderstood the instructions, and the remaining six (the last Ss run in their respective groups) were discarded before the analysis in order to maintain equal cell frequencies.

Apparatus

Ss viewed the AK light by looking into the apparatus, a light-tight plywood enclosure 4' high by 5½' wide. All exterior and interior surfaces were painted flat black. The front of the apparatus consisted of four flat panels, each 2' wide, set at angles of 135° to each other. A 5" by 8" viewing port, 5" from the top, was cut in each panel. A 3" ledge and side pieces framed the opening. The frame, together with a black cloth hood tacked across the top of each panel, prevented stray light from entering the interior. S sat in a chair with his chin on the ledge. The AK light was located on the center of the rear panel of the apparatus; each S's eyes were 2½' from the light.

The AK light, or "target," which Ss viewed was a 1/8" round lucite rod, projecting 1/8" upward from a small metal box. The rod was glued to a GE #3960 neon bulb (¼ w., 120 v.) within the metal box. The bulb was operated at 132 v.

Stimulus duration (7 sec.) and intertrial interval (20 sec.) were timed by two Agastat delay relays. The circuit was arranged so that the two relays cycled continuously when the power was on. Duration of the stimulus varied between 7 and 7½ sec., and the intertrial interval varied between 17 and 23 sec., in a random manner determined by the relay characteristics.

Physical setting. The experiment was carried out in an air-conditioned 8' x 12' room in a temporary frame building on the University of Miami Campus. The air conditioner provided background noise, but noise from other parts of the building was often audible.

The viewing apparatus was arranged along the 12' dimension of the room, with the experimenter's desk to one side. A black curtain hung behind the apparatus, was tacked to the rear edges, and extended from floor to ceiling along the entire length of the room. A red 25-watt bulb hung over the viewing apparatus, and a shaded red bulb was on E's desk. The two red lights were on constantly during the experiment; no other artificial lighting was used.

Design of the Experiment

The experiment was conducted in two periods, on successive days. On the first day, Ss formed norms as described below (the Norm Session). On the second day, Ss were run individually in the Conditioning and Extinction Sessions.

The independent variables were introduced in the Norm Session. These variables were: (1) Group Size (S formed a norm alone, with one other person, or with three other people); (2) Practice (S made 20, 40, or 80 judgments of movement during the Norm Session). A complete 3 x 3 factorial design was used, with 10 Ss in each of the nine possible treatment combinations. The experimental groups are labeled (20-2, 40-1, etc.) according to the particular combination of practice and group size.

The procedure of the Conditioning Session was designed to change S's norm; the purpose was analogous to that of the various influence procedures used in attitude change experiments. S's behavior in the Extinction Session was expected to reflect the degree to which he was "converted" by the influence attempt. The dependent variables are the various measures of change from S's original norm.

Only the Norm Session procedure varied for Ss in the various groups. A brief summary of the procedures of the Conditioning and Extinction Sessions, which are identical for all Ss, is necessary completely to describe the experimental design:

> Conditioning Session. Ss made judgments individually. E reinforced (by saying "right") the first 10 "high responses" (HRs) made by S. The HR class was defined (for each S) as follows: A frequency distribution, in $\frac{1}{2}$" class intervals, was made of S's last 20 estimates in the Norm Session. HRs were defined as those responses higher than the median class. For example, responses of $3\frac{1}{2}$" and above were reinforced for S whose median response was in the 3-3.4" class interval. The session was terminated after the 10th HR. Ss who did not emit 10 HRs within 40 stimulus presentations were discarded.
>
> Extinction Session. Following the Conditioning Session, S made 40 (non-reinforced) judgments of the AK light. The Extinction Session was divided into two 20-trial subsessions (designated E-1 and E-2), separated by a 1-min. rest period.

Control groups. Two control groups of 10 Ss each were run following completion of the main experiment. Ss in both of these groups formed norms in 40 trials, alone. These two groups, designated Control A and Control B, were intended for comparison with the 40-1 condition:

> Control A. Ss were "reinforced" on a random 50% schedule during the Norm Session. E said "right" following S's response, on a different random schedule (determined by coin-flipping) for each S. Ss in group A were treated the same as Ss in the main experiment during the Conditioning and Extinction Sessions.
>
> Control B. Ss in group B formed norms alone as did Ss in the 40-1 condition. For the Conditioning Session each S in this group was "paired" with one S in the 40-1 condition. S in group B was "reinforced" on the trials on which S in 40-1 had been reinforced, regardless of the response he made. Thus each S in group B received noncontingent reinforcement during the Conditioning Session, in a variation of the "yoked control" procedure. The Extinction Session procedure did not vary from that used for experimental Ss.

Procedure

Ss were recruited as volunteers for the "Night Vision Experiment." It was announced, in the call for volunteers, that the experiment involved "making judgments of the movement of a small light in a dark field."

Day 1. Upon entering the laboratory building, Ss waited for E in a small waiting room, located off a narrow hallway, about 25' from the experimental room. The S or group of Ss followed E down the hallway and into the dimly lighted experimental room. Ss were told to sit wherever they liked in the four chairs arranged at the viewing ports.

When Ss were seated, E indicated the "viewing port through which you will view the target light," and the cloth hood which Ss

were to pull over their heads. They were told that it would be necessary for their eyes to dark adapt for five minutes before the experiment began. After this period, E said, "All right, we're ready to begin. Please listen to the instructions I'm going to read to you."

> This is an experiment in visual discrimination. After I tell you what to do, and you take your place(s)* at the apparatus, I will turn on a small light inside. After a short while, the light will start to move. Then it will go off. After the light is off I want you to tell me the distance the light has moved. Make your estimates in full inches or half-inches. For example, say "5½ inches," or 7½ inches," or "10 inches," and so on. (Give your estimates one at a time, beginning with the person at the left.) The light will move no less than one inch and no more than 24 inches. Report only the distance that the light moves. Do not report the direction of movement. Do you have any questions?
>
> OK, please move up to the apparatus and pull the cloth over your head. You'll be more comfortable if you rest your chin on the ledge. I'll turn on the light so that you can locate it before we start...do you see it? (Pause until all Ss reported seeing the light.) The click that you hear will signal that the light is on. There will be a short pause between the lights, so you will have time to give me your estimate(s) (one after the other, beginning with _____). Please speak loudly so that I can hear you through the cloth. OK, here's the first one. Give (begin giving) me your estimates as soon as the light goes out.

After the first presentation, E switched off the apparatus, and (after each S had made his report) said: "That's the idea. The light will keep coming on at regular intervals. Give me your estimate(s) after each one." Thereafter the AK light was presented automatically for 7 sec. every 20 sec. After 20 presentations, a 1-minute rest period was introduced; Ss were told to "rest your eyes for a minute,

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*Instructions in parentheses were given in the group judging conditions only.

and then we'll continue. You may sit up if you'd like." Rest periods were taken after each 20-trial period. Upon completion of the required number of trials, E made individual appointments with Ss to return for the second day's sessions.

Day 2. When S entered the experimental room, he was told to take any seat he wished, and that "we'll be doing the same thing as yesterday." After the 5-minute dark adaptation period, S was instructed:

> I want you to make estimates as you did yesterday. At the start, I'll say "right" when you guess within a half-inch of the correct distance. Otherwise, I'll say nothing. OK?...Take your place at the apparatus...Ready? I'll show you the light first so you can locate it...OK, here's the first one.

The Conditioning Session began with the first presentation of the AK light following these instructions. The Session was terminated following the 10th HR or the 40th presentation, whichever came first. Ss who made 10 HRs in 40 trials or less were then given a 2-minute rest period, after which the Extinction Session began.

No additional instructions were given to S before starting the Extinction Session. The two 20-trial blocks of extinction trials were separated by a 1-minute rest period. Ss who asked if E was going to say "right" any more were answered: "I can't give you any more instructions until the experiment is over."

Immediately following the last extinction trial, a brief interview was held, in which S responded verbally to a series of questions about his experience (see the "Post Experimental Questionnaire," reproduced in Appendix III). Following the interview, S's questions

were answered in a noncommittal manner. The suspicions of those Ss who suspected the AK phenomenon were confirmed, and these Ss were cautioned against disclosure to prospective Ss.

Finally, Ss' cooperation was requested in filling out a questionnaire; Ss were told that it was "for another project I'm doing," and that it would take them "only about five minutes to complete the questionnaire." Included in the questionnaire were 20 items chosen randomly from Bass's (1956) 56-item Social Acquiescence Scale, and the complete form of McDavid's (1962) Social Reinforcement Scale. Ss completed the questionnaire in the waiting room, signed their names, and left the forms in a box for E. (The test scores yielded no useful information; these tests will not be referred to again.)

Data. Each estimate made by S in each of the Sessions was recorded immediately on a data sheet for that individual. Also recorded on the form were spontaneous comments by S, and his replies to the Post Experimental Questionnaire.

Hypotheses

The following specific hypotheses, which were based upon the considerations discussed in Chapter I (and upon the rather extensive pilot studies), were made:

1. All Ss are expected to show evidence of conditioning, as demonstrated by significantly higher AK movement estimates in the Conditioning and Extinction Sessions. Both within-subject comparisons and comparison of the mean estimates of Ss in condition 40-1 with Ss in control B will demonstrate conditioning.

2. The differential effects of the independent variables are expected to be manifest in the second half of the Extinction Session. The measures taken during the extinction session are conceived as measures of "conversion." No differential effects are expected in the Conditioning Session, which is a "conformity" situation.

3. Changes in norms will be inversely related to group size and to practice. Greater change will occur in the norms of those individuals who form their norms in smaller groups. Similarly, Ss having less practice in the norm formation period are expected to change their estimates more than individuals having more experience.

4. There will be a significant interaction between group size and practice. The effects of these variables will be additive.

RESULTS

The effectiveness of the conditioning and extinction procedures in changing HR frequency is shown in Fig. 1. Mean HRs for all 90 experimental Ss are plotted, for the four experimental periods. HRs were defined for each S as those estimates equal to or exceeding the lowest response reinforced in the Conditioning Session. The between sessions differences are highly significant ($F = 30.12$, $p < .001$). (See Appendix I for further discussion of HR analyses.)

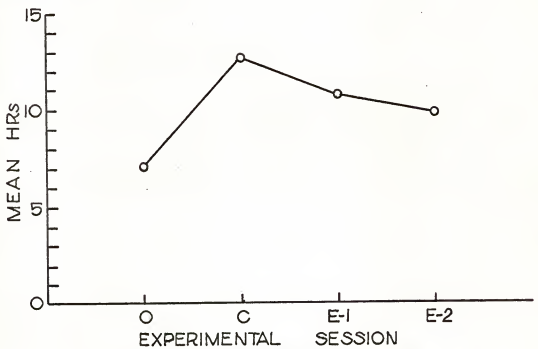

Fig. 1. High Responses as functions of the experimental conditions

Means of Ss' estimates in the four sessions are the scores used in the following analyses. Means of Ss' last 20 estimates in the Norm Session are designated O scores; Ss' means for the Conditioning Session are the C scores; Ss' mean estimates for the first and second 20 trial blocks of the Extinction Session are designated the E-1 and E-2 scores. A discussion of the choice of dependent variables will be found in Appendix I; scores for each S are compiled in Appendix II.

Norm Formation

Norms for each S are the "O scores" mentioned above. The formation of group norms in the AK situation has been reported by many experimenters. The following comparisons support their findings:

Mean differences in O scores between members of the 20 two-man groups was 0.77". The 40 Ss who judged alone were divided into 20 pairs based on their order of appearance at the laboratory; the mean difference for these 20 pairs was 3.50".

Norms formed under the various experimental conditions were quite different; the means for the nine subgroups are shown in Table 1. Analysis of variance showed significant effects of practice ($p < .05$), group size ($p < .01$), and the P x G interaction ($p < .05$). That these initial differences persisted throughout the experiment is further evidence of norm formation.

Conditioning

Conditioning is evidenced by the over-all increase in group HR data, as shown in Fig. 1, and also by the increase in mean estimates (although some Ss showed no increase). There was no differential

TABLE 1

MEANS OF S'S MEANS OF THE LAST 20 AK ESTIMATES IN THE NORM SESSION

		Group Size			Row means
		1	2	4	
Practice Trials	20	3.65	5.12	2.69	3.82
	40	4.37	3.29	2.99	3.55
	80	3.68	2.35	2.09	2.70
	Column Means	3.90	3.58	2.59	3.36

effect of the norm formation conditions (practice and group size variations) upon C scores. Fig. 2 illustrates this point; the lines connecting the O and C points are nearly parallel. When mean C scores are adjusted* for the initial differences in norms, as shown in Fig. 3, there is no significant difference in C scores.

Extinction

The differential effects of the independent variables upon behavior in the extinction session are suggested by the curves of Fig. 2. The differences are somewhat obscured because of the original differences in norms. Differential effects are better demonstrated when adjusted mean values* are plotted, as shown in Fig. 3.

An analysis of covariance of the E-2 data, presented in Table 2, confirms the apparent effects presented graphically. The only significant effect is that of the size of the group in which the norm

*Adjustment was accomplished by the method of covariance; see Appendix I.

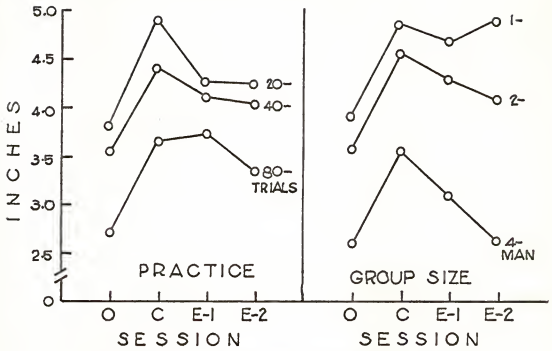

Fig. 2. Mean AK estimates as functions of the experimental conditions

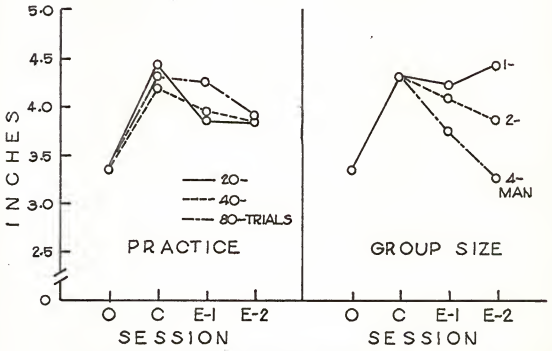

Fig. 3. Adjusted mean AK estimates as functions of the experimental conditions

TABLE 2

ANALYSIS OF COVARIANCE OF Ss' MEAN ESTIMATES IN THE SECOND EXTINCTION (E-2) SESSION

Source	df	ms	F
Practice (P)	2	0.035	0.02
Group Size (G)	2	17.890	4.34*
P x G	4	1.050	0.51
Error	80	2.060	
Total	88		

*$p < .025$

was formed. The practice variable did not affect Ss' behavior in the Extinction Session, nor were there interaction effects.

Confirmation of the effects shown by the analysis of covariance is provided by the results of a mixed analysis of variance of the nonadjusted mean E-1 and E-2 scores. In this analysis, presented in Table 3, the within-subject comparisons are of major interest. The focus is upon trend interactions, which reflect the differences in slope of the extinction curves presented in Fig. 2. The significant G x T interaction demonstrates that the slopes of the extinction curves are different for the 1-, 2-, and 4-man groups. As in the previous analyses, no differences attributable to the practice conditions are demonstrated.

TABLE 3

ANALYSIS OF VARIANCE OF Ss' MEAN ESTIMATES IN THE TWO EXTINCTION PERIODS (E-1 AND E-2 SCORES)

Source	df	ms	F
Between Ss	89		
Practice (P)	2	8.22	1.15
Group Size (G)	2	59.48	8.32**
P x G	4	19.43	2.72*
Error (b)	81	7.15	
Within Ss	90		
Extinction Trend (T)	1	1.21	2.09
P x T	2	0.565	0.98
G x T	2	1.855	3.21*
P x G x T	4	0.365	0.63
Error (w)	81	0.578	

*$p < .05$
**$p < .001$

Control Group Comparisons

The two small control groups furnish some indication of the processes responsible for the effects observed. Control Groups A and B, as compared with the 40-1 Experimental subgroup, established very similar norms (the 0 means in Table 4). The ten Ss in each of the three groups experienced similar learning conditions during the Norm Session, except that Group A Ss received random verbal reinforcement following their estimates. The conditioning was the same for the three groups, with the exception that Control B Ss' reinforcements were not contingent upon the responses which they made.

The data summarized in Table 4 were subjected to a mixed analysis of variance, using the scores for all four periods. This analysis is

TABLE 4

MEANS OF THE MEAN AK ESTIMATES OF Ss IN GROUP 40-1 AND THE TWO CONTROL GROUPS, FOR THE FOUR EXPERIMENTAL PERIODS

Group	Experimental Period				Total
	O	C	E-1	E-2	
Group 40-1	4.37	5.87	5.17	5.33	5.18
Control A	4.21	5.24	4.31	4.48	4.56
Control B	4.40	5.22	4.99	4.55	4.79

TABLE 5

ANALYSIS OF VARIANCE FOR COMPARISON OF GROUP 40-1 WITH CONTROL GROUPS A AND B (THE DATA SUMMARIZED IN TABLE 4)

Source	df	ms	F
Between Ss	29		
Groups (G)	2	0.495	0.31
Error	27	1.588	
Within Ss	90		
Trend (T)	3	0.337	6.24*
G x T	6	0.022	0.41
Error (w)	81	0.054	
Analysis of Trend for each group:			
Group 40-1 (T)	3	0.183	3.39**
Control A (T)	3	0.123	2.28
Control B (T)	3	0.073	1.35

*p < .001
**p < .025

presented in Table 5. While the between-groups comparisons do not show reliable differences, a breakdown of the significant trend effect does show that the groups differed in their response to the conditioning procedure. The specific comparisons of trend are shown at the bottom of Table 5. The only significant change over experimental sessions is the change shown by Group 40-1. Therefore, it is demonstrated that: (a) The increases in AK movement reported by the experimental Ss are attributable to the reinforcement contingency; and (b) the effects of prior verbal reinforcement (Control A) on C and E Scores were similar to the effects of "reinforcement" in the group norm formation conditions. The latter finding is supported by comparisons of groups A and 40-2 (see means in Appendix II).

Supplementary Observations

In general, the data from the Post-experimental Questionnaire support the observations of previous AK experimenters. Therefore, no detailed summary of these data will be given.

About half of Ss said that E's "right" had affected their estimates. Another one-fourth of Ss said that it might have influenced their estimates. Less than a quarter said that the reinforcements had not affected their judgments. A popular response to the question was to the effect that E's verbalization had provided feedback or knowledge of results (some Ss indicated that they "felt better").

Nearly all Ss were able to name some or all of the distances which were correct. Many reported spontaneously their concern when E did not say "right" any more; some Ss asked questions before the first extinction period was finished. Only a small minority of Ss

who served in the group condition admitted being influenced by the other group members. Common responses to this question were: "I couldn't have been influenced, I gave mine first," and, "I made my mind up before the others said anything."

A few Ss reported that the AK light moved differently during the Extinction Session (i.e., that its movement was different from that of the previous session in direction or extent). One S reported very erratic movements during the Extinction Session.

Perhaps half a dozen Ss suspected that they were observing autokinetic movement, though none was certain. On the whole, the deception appeared to be very effective. One S reported that he planned on doing an experiment "something like this one, but using the autokinetic effect." He found it difficult to believe that he had been observing AK movement! This S said that the literature on the AK effect suggests (as it does) that movement does not occur immediately; his experience had been that the light began moving without delay.

DISCUSSION

The results cited support the hypothesis that norms formed by an individual serving alone are "weaker" than norms formed with other individuals. The relationship between strength of norms and group size is approximately linear, for the group sizes used in this experiment. Evidence for the conditioning hypothesis is also clearcut.

Practice did not differentially affect the strength of autokinetic norms, although it did influence the norm formation process itself. The effects of practice appear to confirm earlier findings reported in the Introduction; a weak effect is shown in the alone condition. (Adjusted E-2 means for the 20-1, 40-1, and 80-1 subgroups were 4.52", 4.45", and 4.33".) It must be concluded, however, that under the conditions of this experiment, practice did not significantly affect later behavior.

Comparison of the control groups with Group 40-1 supports the hypotheses concerning the effects of conditioning and of "reinforcement" in the learning situation. Although the noncontingent reinforcements did increase the estimates of Control B Ss somewhat, the overall change over the four experimental periods was not significant. By comparison, the comparable contingent reinforcement group (40-1) did show changes, which are attributed to the reinforcer.

Results of the comparison of Control A with Group 40-1 lends support to the hypothesis that factors operating in the group judging

situation serve to reinforce Ss' estimates. In the actual group situation, the other Ss agree with S part of the time; thus reinforcement is on a random schedule similar to that of the Control A Ss. The effect of previous reinforcement upon the behavior of Control A Ss is shown both in the conditioning and extinction periods. Ss who had been previously reinforced showed less conformity and less conversion effect than the comparable group (40-1) which had not received verbal reinforcement during learning. The similarity in behavior of the Control A and the 40-2 Ss also supports a reinforcement interpretation of the effects of group judging (see Appendix II).

Conformity and Conversion

No differential effects of the learning conditions were found in the conditioning data. Thus, "conformity" was not affected by the learning conditions; in short, Ss conform equally regardless of the strength of their norm.

Ss who formed norms in groups were less "converted" than Ss who formed norms alone. This confirms previous observations concerning the effects of "reference group identification," although the present findings are couched in learning terminology. The present interpretation of this effect is that reinforcement of S's responses is greater when he makes them in common with other individuals. Within the limits of the present design, practice (number of times which the individual makes the response) does not affect his resistance to conversion.

Implications

The findings of this study have implications for attitude

change. An individual's beliefs, attitudes, and norms will be stronger when he has been reinforced for the component responses. The number of reinforcements does not seem to be an important factor, although it seems doubtful that strong beliefs are established through "one trial learning."

"Brainwashing" (Schein, 1959), a topic of continuing interest, may be cited as an example of the possible application of the present findings. As Schein points out, many prisoners cooperated with their captors (conformed); although there is little evidence of permanent changes in beliefs (conversion). In the present study, nearly all Ss "conformed," though many were not "converted." How can we best prepare soldiers to resist attempted brainwashing? One answer seems to be: Encourage "loyal," "patriotic" responses, and provide strong social reinforcement for the responses. It is necessary, as a first step, to identify the desired responses; this question obviously involves the value structure of the society. The specification of social reinforcers is and will continue to be an important concern of social psychology.

"Specification of the reinforcer" is not an easy task, however. As pointed out in the previous paragraph, a great deal of psychological research is concerned with the discovery of stimuli which are reinforcing. It is not necessary to attribute increased magnitude or frequency of responses to external reinforcing stimuli. E. B. Holt (1931), a pioneer behaviorist, discussed the tendency of children to repeat a response just made in terms of "the circular reflex." Holt also noted the tendency to echo, or imitate, sounds or responses made

by others. This "echoic" tendency was demonstrated in the verbal behavior of adult Ss in an experiment by Ritter (1949).

The present study demonstrates that behavioral approaches are useful in social psychological research. Stimulus-response analyses have much to offer in the way of clarification of important theoretical and applied problems.

SUMMARY

An experiment was conducted to investigate the contribution of learning factors to the stability of autokinetic norms. One hundred ten male college student volunteers formed norms alone or in groups of two or four. Norms were formed with varied amounts of practice (20, 40, or 80 judgments) on the first day of the experiment. The mean of his last 20 estimates defined the individual's "norm."

On the day following norm formation, a verbal conditioning procedure was employed to influence Ss' estimates, in individual sessions. The experimenter reinforced the first ten high estimates (those above S's median judgment in norm formation) by saying "right." An "extinction" period, in which S made 40 judgments, followed the conditioning session. The overall design was similar to that of an attitude change experiment, in which the "norm" corresponds to the attitude measured before the influence attempt. Similarly, the conditioning procedure corresponded to the "influence attempt," and Ss' mean estimate during "extinction" is analogous to the postinfluence attitude.

It was assumed, on the basis of theory and previous experimentation, that:

1. Ss will "condition" (i.e., change their norms) when larger estimates are reinforced.

2. Ss' estimates will decline toward their previously established norm in the extinction session.

3. Ss who have established strong norms will return to these norms more quickly following "conditioning" than will Ss having weak norms.

The changes in Ss' estimates during the conditioning session were construed as "conformity"; the difference between S's norm and the mean of his estimates on the last 20 extinction trials is a measure of the degree of his "conversion." It was hypothesized that:

1. There will be no differences in conformity attributable to the learning conditions.

2. Conversion will be inversely related to the size of the group in which S forms his norm.

3. Conversion will be inversely related to the amount of S's experience in the norm formation situation.

4. The effects of group size and practice will be additive.

Hypotheses 1 and 2 were supported. No differences in conformity attributable to the norm formation conditions were found. Differences in conversion were found for the three levels of the group size variable; Ss who formed norms in the smaller groups made significantly higher estimates in the extinction period than did Ss who formed norms in larger groups. Hypotheses 3 and 4 were rejected on the basis of the findings. The levels of practice used had no consistent effect upon the conversion of Ss' norms.

An unexpected finding was that the independent variables affected the size of the norms established. The larger groups established smaller norms than the small groups, and norms established with more practice were also smaller. Moreover, the interaction between the two variables in norm formation was significant, indicating that the

specific combination of group size and practice is important.

The experimental results were interpreted in terms of reinforcement principles. Responses (estimates) made by individuals in the presence of others were more strongly reinforced than were responses made alone. Further, more reinforcement is received for estimates made in the presence of three other persons than for estimates made with only one other person.

The implications of this study for understanding attitude change were discussed in terms of the importance of specifying the conditions under which attitudes are acquired. Controlled behavioral studies are thus viewed as being potentially important in the solution of the theoretical and practical problems facing social psychology.

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APPENDICES

APPENDIX I

Dependent Variables

1. Use of means. Medians of Ss' autokinetic estimates have been used by most investigators interested in norms. The use of means requires some justification, for which the following observations are cited: It was observed that some Ss tend to make higher or lower estimates toward the end of a group judging session, tending to make their mean closer to the group mean. This suggestion is confirmed by the data. Of 20 pairs of Ss run in the two-man condition, 14 of the differences between pair-members' means were smaller than the differences between their medians. Further analysis showed that, for the 40 Ss, 25 of the 36 Ss whose medians were different skewed the distribution of their estimates toward the partner's median.

2. Frequency measures. Analysis of Ss' behavior in terms of numbers of High Responses did not prove to be sufficiently discriminative to reveal the precise nature of the differences produced by the independent variables. As noted in the results section, analyses of variance of HR data did show highly significant differences between experimental periods; no differences attributable to the independent variables were revealed by the parametric analyses, however. Chi-square analysis of between-groups differences in HR frequency does support the results inferred from analysis of mean estimates. The frequencies in the O, C, E-1, and E-2 periods were analyzed. Only the differences in E-2 HRs were significant ($X^2 = 11.82$, 4 df, $p < .02$).

3. Definition of "norm." The mean of Ss' last 20 estimates in the norm session was used in the analyses presented. Alternative definitions were possible for theose Ss who made 40 or 80 judgments in the norm session; either the "first 20" estimates, or the mean of all estimates might represent a better measure of S's norm. The concept "norm" implies a tendency to behave in certain predictable ways; the correlations of these various alternative "norms" with Ss' E-2 scores support the present usage: The correlation of "last 20 trial" norms with E-2 scores was 0.77; "first 20 trial" norms correlated 0.65 with E-2 scores; "means of all estimates" norms correlated 0.61 with E-2 scores.

4. Adjusted scores. The adjusted scores and adjusted means reported were obtained by means of covariance adjustments. Based upon the within-groups regressions of O scores on C, E-1, and E-2 scores, separate adjustments were made for each experimental period. The three regression coefficients:

$$b_{oc} = 1.02$$

$$b_{oe1} = 0.86$$

$$b_{oe2} = 0.87$$

An F-test of heterogeneity of the regressions of O on E-2 scores showed no significant heterogeneity ($F = 1.32$, 8 and 72 df). Therefore the homogeneity of regression assumption necessary for use of analysis of covariance was tenable.

APPENDIX II

TABLE 6

MEAN AK ESTIMATES

S No.	O	C	E-1	E-2	S No.	O	C	E-1	E-2
				(Brackets indicate Ss who formed norms together)					
Group 20-1					Group 40-1				
9	1.15	1.62	2.25	2.08	13	3.58	4.35	3.40	4.70
10	2.65	2.52	2.28	4.28	15	2.10	2.90	2.12	1.78
11	3.42	3.80	4.82	5.30	53	7.00	7.88	8.15	8.20
57	11.95	13.00	9.55	10.90	54	2.10	3.62	2.78	3.48
59	2.60	2.91	2.80	2.98	56	4.20	5.57	4.80	3.62
60	3.78	8.30	4.80	5.90	89	4.65	5.00	5.35	5.74
85	1.55	1.97	1.58	1.55	90	4.28	4.39	3.62	4.55
87	4.85	4.88	5.50	6.65	91	6.14	7.77	7.35	10.70
88	2.38	4.06	5.30	5.85	92	6.28	8.00	7.25	5.65
111	2.20	2.31	2.60	2.22	116	3.41	9.21	6.85	4.85
Sum	36.53	45.37	41.48	47.71		43.74	58.69	51.67	53.27
SD	2.95	3.36	2.26	2.68		1.60	1.57	2.10	2.40
Group 80-1					Group 20-2				
33	2.50	3.16	6.65	6.18	[1	2.58	3.29	3.28	3.70
34	5.40	6.32	7.70	9.85	[2	2.66	2.92	3.25	2.65
36	3.38	4.00	3.20	1.98	[49	4.75	6.96	4.90	5.95
41	5.22	4.28	4.42	5.01	[50	5.40	5.29	9.70	6.65
42	2.15	2.24	2.50	1.60	52	3.52	7.70	7.18	7.90
43	4.10	3.88	4.02	4.38	82	6.68	7.28	6.08	5.88
44	5.40	7.45	6.95	5.55	[83	7.58	9.67	6.10	6.65
77	2.92	4.47	6.25	6.18	[84	7.20	8.35	5.65	5.15
79	3.32	2.96	3.60	3.22	110	6.80	7.22	9.90	8.55
80	2.38	3.29	2.12	2.10	114	4.02	4.33	3.32	3.45
Sum	36.77	42.05	47.41	46.05		51.19	63.01	59.36	56.53
SD	1.21	1.49	1.89	2.40		1.79	2.13	2.31	1.81

TABLE 6—Continued

S No.	O	C	E-1	E-2	S No.	O	C	E-1	E-2
				(Brackets indicate Ss who formed norms together)					
Group 40-2					Group 80-2				
[5	3.48	3.80	3.85	3.58	[17	3.55	3.64	3.45	2.68
[6	3.05	3.26	3.12	3.28	[18	2.95	3.66	4.45	6.05
8	3.58	4.36	4.12	3.72	[19	3.48	6.95	6.32	5.60
69	4.05	3.80	2.85	1.85	[20	2.68	3.95	2.98	2.38
[71	5.05	7.06	8.10	9.85	[65	3.70	3.90	3.52	3.68
[72	4.88	4.84	4.72	4.32	[66	1.92	1.69	2.88	2.25
[73	1.90	2.08	1.92	1.58	[67	1.98	3.31	4.05	2.98
[74	2.08	2.50	2.80	2.15	[68	2.15	3.00	3.00	2.95
[75	3.55	5.50	5.70	4.50	[97	0.88	4.15	0.88	1.15
[76	0.85	1.45	0.58	0.55	[98	0.18	0.61	0.34	0.45
Sum	32.47	38.65	37.76	35.38		23.47	34.86	31.87	30.17
SD	1.26	1.59	1.94	2.43		1.10	1.57	1.61	1.66
Group 20-4					Group 40-4				
[25	0.85	1.36	1.25	1.45	[29	3.40	2.98	2.88	3.28
[26	1.02	2.00	1.90	2.20	[30	3.28	3.17	2.45	4.42
[28	1.18	2.65	1.10	1.35	[31	4.35	4.26	5.02	2.52
[61	3.82	7.08	4.30	2.38	[32	2.90	4.73	4.28	3.48
[63	2.98	4.09	2.90	2.75	[37	2.90	3.28	3.00	1.92
[95	1.72	3.88	2.30	2.15	[39	3.02	2.57	2.90	3.30
[96	4.35	4.67	4.98	4.25	[40	3.32	3.38	3.92	3.32
[117	4.28	4.11	3.12	2.15	[105	1.70	3.04	3.90	3.38
[119	3.22	2.95	1.55	1.60	[106	2.62	4.00	3.12	2.90
[120	3.52	6.00	3.15	2.35	[107	2.38	3.11	2.30	3.30
Sum	26.94	38.79	26.55	22.63		29.87	34.52	33.77	31.82
SD	1.30	1.66	1.22	0.79		0.66	0.63	0.82	0.62

TABLE 6—Continued

S No.	O	C	E-1	E-2	S No.	O	C	E-1	E-2
(Brackets indicate Ss who formed norms together)									
Group 80-4					Control A				
21	2.38	2.69	2.72	3.22	121	2.55	4.15	3.32	3.98
23	2.38	4.18	4.62	3.98	123	2.60	5.85	1.76	2.48
45	1.88	3.73	2.92	2.30	124	4.38	5.05	5.95	6.15
46	3.58	6.40	7.60	3.62	126	9.12	10.10	11.10	11.25
47	2.22	3.60	2.75	1.55	131	3.20	3.75	3.03	2.62
48	3.38	5.35	4.18	3.30	134	11.60	12.86	8.88	8.82
101	1.48	2.85	1.55	1.40	135	1.65	2.22	2.75	2.88
102	1.15	1.19	1.50	1.72	140	2.05	2.45	1.90	1.92
103	1.00	1.08	2.50	1.10	141	2.42	3.00	2.00	2.20
104	1.42	1.45	1.90	1.62	151	2.52	2.93	2.43	2.45
Sum	20.87	32.52	32.24	23.81		42.09	52.36	43.12	44.75
SD	0.84	1.68	1.75	1.00		3.20	3.36	3.09	3.06
					Control B				
					122	4.82	5.12	4.70	3.92
					127	5.10	6.43	6.62	6.60
					128	5.70	11.08	10.65	7.85
					130	13.20	9.42	13.65	13.00
					132	2.18	6.13	3.95	3.58
					136	2.30	1.93	2.15	2.00
					138	1.20	2.45	1.38	1.12
					147	2.05	2.69	2.08	3.42
					148	4.52	4.96	3.22	2.48
					149	2.60	1.95	1.45	1.50
					Sum	43.97	52.16	49.85	45.47
					SD	3.27	3.00	3.95	3.48

APPENDIX III

POST EXPERIMENTAL QUESTIONNAIRE

1. Was it difficult to estimate the distance? Why?

2. What influenced your estimates most?
   Did this change during the experiments?
   Were your judgments influenced by the others?
   Did my saying "Right" affect your estimates?

3. What were the correct distances?

4. Spontaneous comments by S:

5. Notes:

BIOGRAPHICAL SKETCH

William Frank Stone was born December 29, 1931, in Camden, Maine. In June, 1949, he was graduated from Camden High School. He received the degree of Bachelor of Arts from the University of Maine in 1956. He was an Inspector for the Factory Insurance Association from 1956 to 1959.

In September, 1959, Mr. Stone entered the Graduate School of the University of Florida. He held assistantships in the Department of Psychology, and was a Clinical Psychology Trainee (Research) in the Veterans Administration program. He received the Master of Arts degree from the University of Florida in January, 1961. His doctoral specialization was in social-experimental psychology.

William Frank Stone is married to the former Mary Emaline Perry. He is a member of Psi Chi and the Florida Psychological Association. He has been appointed Assistant Professor of Psychology at Wilson College, effective September, 1963.

This dissertation was prepared under the direction of the chairman of the candidate's supervisory committee and has been approved by all members of that committee. It was submitted to the Dean of the College of Arts and Sciences and to the Graduate Council, and was approved as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

August 10, 1963

Dean, College of Arts and Sciences

Dean, Graduate School

Supervisory Committee:

Chairman